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When the science of linguistics is treated as a variety of ways for searching for truth and theory, rather than as a body of established theories, it can be taught successfully in the early grades. Some of the generalizations in linguistics (e.g., the articulatory description of differences between significant sounds, of the classification of parts of speech by form and function) do not hold true in every instance; nevertheless, the methods used by linguists to investigate problems are valuable and can be used with elementary students. For example, to work with the many problems of classification in language, children can be taught that the criteria for classifying items must be of the same order and that the resulting classification scheme must be significant in some way. Examples of criteria which can be used advantageously are (1) numbers of syllables, (2) consonant-vowel groups, (3) spelling and sound relationships, and (4) parts of speech. By making such classifications, the children will learn not only methods of investigating problems and formulating theories but also a great deal about English grammar and the nature of language in general. (JS)

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JOHN DAWKINS

Linguistics in the Elementary Grades

The point of this article is that linguistics *in the best sense of the term* can be taught in the early grades by any intelligent teacher. Providing that the teacher and the students have some tools to work with, and it will be seen that they very obviously do, the teaching-learning process can be a discovery process, which in the best sense of the term is precisely what linguistics is.

What is linguistics?

Linguistics, the study of language, is an old and really quite respectable science.¹ Like any science, it has led to the discovery of what we are tempted to call "truths" and of methods that seem to be eminently serviceable. These results, however, are of a limited or general nature. We know a good deal about many of the features that make up language and languages, but we have only hypotheses about the systems (including culture) which make these features operate as language itself. For this reason, it is easy enough to give the lie to false and misleading statements about language, and it is not impossible to make true but incomplete statements about many aspects of language, but beyond this we must become either hypothetical or general. For example, we know from both historical and dialectal studies that the notion of "correctness" needs to be modified in terms of style, appropriateness, effectiveness. We know that

¹Several readable histories are available. One of the best is John T. Waterman's *Perspectives in Linguistics* (Phoenix Books), 1963.

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such notions as "lazy articulation" are unintentional yet vicious slurs on the victims of the diagnosis. We know that defining nouns as names is a philosophical approach to language while defining them as distinctive linguistic features in a particular language is a linguistic approach. Each definition has its value, but the values are all but destroyed when we blur the distinctions. We know that it is conceptually and factually very confusing to think about language as a sum of its words. A language is, no doubt, a kind of algebra—although linguists are indeed disputing theories of grammar, let alone particular grammatical analyses; indeed, we have no real grammar of English.

Linguistics is by no means a body of ascertained truth and theory;² it is far more a variety of ways of going about the search for truth and theory, ways that yield testable results by virtue of their systematic application to the data. The essence of it, and of science in general, might even be said to boil down to good work habits, good thinking, good intuitions. Now, to get back to our students, what do we really

²It should be worth a footnote to reemphasize all this by recasting it. Since teachers disclaim knowledge of linguistics and since linguists disclaim knowledge of teaching, we have middlemen translating bits of linguistic statements into school book statements. But there is a grave danger in thus presenting linguistics as a selection of statements that are implicitly *the truth*—are we simply substituting a new set of rote learnings for an old set? Raven McDavid is but one of the latest to caution us about the profitless substitution of a new dogma for an old. See his "American English," *College English*, February 1964, pp. 334-5. See also James Sledd's "A Plea for Pluralism," *College English*, October 1961.

want them to do? Is it "linguistics" if they can throw back at us the definitions of the parts of speech? Or discriminate between "correct" and "incorrect" forms? Or tell us some regional variants for *griddle cakes*? It would seem to be much more like "linguistics" if they knew how to arrive at these conclusions by knowing how to handle data and how to generalize.

In the rest of the article I will try to characterize more specifically what is meant by linguistics in the best sense of the term by discussing two problems in the analysis of English (a phonological problem and a part-of-speech problem) and then try to show that linguistics in just this sense can be taught in the elementary grades.

Phonological problem.

Two of the significant sounds ("phonemes") in English are *t* and *d*. By the method of articulatory description, we say that both sounds are formed by closing the apex of the tongue against the alveolar ridge of the mouth ("apico-alveolar"), that both are uttered with an explosive release of the closure ("stops"), that they contrast with each other by voicing (*t* is voiceless since the vocal bands are relaxed and open and thus not set into vibration by the passing air stream, whereas *d* is voiced since the vocal bands are sufficiently tensed and closed to be set into vibration by the passing air stream, the vibrations in turn causing pulsations of the air stream that make up voicing). Such a description is generally true, but we soon encounter problems. Contrast these *t*'s and *d*'s:

tin	fat	latter
din	fad	ladder

The several *t* and *d* sounds in these words are *not* identical, but in phonemics, which is concerned with the significant sounds of a language, we say that they are the same in significance since each *t* con-

trasts significantly with each *d* (*tin* contrasts with *din*, etc.). This statement, however, requires us to look more deeply into the occurrences of such items as *latter* and *ladder* and *otter* and *odder*. Is there really any difference between the *t* and *d* sounds in these words? Perhaps not—or, if there is, it is hardly a voiceless-voiced contrast. Our articulatory statement, therefore, does not seem to be adequate for the problem. But the methods of articulatory description are not therefore wrong or bad; on the contrary, they reveal valuable and interesting descriptions of linguistic phenomena. The point is that, as students of language, we use what methods we can in order to understand truths and untruths and in order to test hypotheses—even to discover new methods. This is linguistics.

Part-of-speech problem.

In describing and classifying the parts of speech, most grammarians consider both morphological and syntactical data. As we should expect, there are various methods for attacking the problem, each having its own degree and kind of adequacy. The typical school book method, in order to distinguish words called adjectives, uses the following kinds of criteria: "An adjective is a word that modifies a noun; it may point out, tell how many, or describe." The criteria are then supplemented by examples of such words. This method has been shown to be inadequate in a number of ways. In *the boy here*, the word *here* points out (or does it describe?), and yet it is usually called an adverb. In order to decide that it is an adverb, the student is expected to switch criteria ("an adverb tells where"), although he has never been told why, when, or how to make the switch.³

³Since the definition and exemplification is all the help that youngsters are given, it is no wonder that they are slow to learn grammar. It takes a great

There is a similar difficulty in the following expressions, each of which contains a word that modifies, or points out, or describes:

the senator	true greatness
Mr. Senator	truly great
United States Senator	talking children
good senator	children talking

Using methods of comparison and contrast, a linguist might approach this problem by examining all of the potential occurrences (and any accompanying features) of the words that modify nouns. We know that English words have two outstanding grammatical characteristics—differences in form and differences in syntactical function—and thus we are obliged to account for both characteristics even when they appear to be in conflict. The formal differences (such as those given in a dictionary entry) are concrete evidence for different kinds of words. For example, a base word that inflects with *-s*, *-ing*, and *-ed* is a verb. Formal considerations alone, however, are seldom enough. We would be reluctant to consider every occurrence of *interesting* a verb just because it has *-ing* and, as a base form, the potential of having *-s* and *-ed* as well. (Is it a verb in *the interesting child*?) To examine these suspected differences, we can begin by setting up some comparisons and contrasts (Note: expressions marked* are not grammatical):

1. The *boring* joke was about...
2. *The joke *boring* was about...
3. The joke *boring* me was about...
4. The joke that was *boring* me was about...
5. The joke that was *boring* to me was about...

deal of sophistication—of positive and negative reinforcing experiences—to discover when and when not to use the often conflicting and never systematic criteria given in their school books.

6. *The joke that was very *boring* me was about...

7. The joke that was very *boring* to me was about...

This data is not complete, but it is enough to suggest several hypotheses for testing. (1) If it is a verb, it can follow the noun; if it is an adjective, it cannot follow the noun.⁴

- | | |
|---------------------------------|-------------|
| 8. The <i>running</i> boy ... | } verb |
| 9. The boy <i>running</i> ... | |
| 10. The <i>good</i> boy ... | } adjective |
| 11. *The boy <i>good</i> ... | |
| 12. The <i>boring</i> joke ... | } adjective |
| 13. *The joke <i>boring</i> ... | |

And when *boring* (the item in 12 and 13) does occur after the noun, it behaves exactly as any transitive verb by taking an object:

- | | |
|--|---------|
| 14. The joke <i>boring</i> me ... | } verb. |
| 15. The man <i>keeping</i> the store ... | |

(2) If it is an adjective, a word like *very* can modify it; if it is a verb, *very* cannot modify it:

- | | |
|-------------------------------------|-------------|
| 16. a very <i>good</i> joke | } adjective |
| 17. a very <i>boring</i> joke | |
| 18. a <i>running</i> boy | } verb |
| 19. *a very <i>running</i> boy | |
| 20. a joke very <i>boring</i> to me | } adjective |
| 21. *a joke very <i>boring</i> me | |

Probably in the course of such investigations, someone realized the simple generality of the "very" criterion, for it readily and accurately sorts out adjectives from other kinds of words (except *-ly* adverbs). In one of the best discussions of English grammar, this criterion has such force that it excludes *main* and *chief* from the adjective classifi-

⁴When such is not the case, there are good reasons—the case of archaisms (*a princess sweet*), the case of special adjectives having verbal force (*the worst lie imaginable*), and the case of compounding (*the geese, lazy and silly*).

cation.⁵ However, why *main* and *chief* are therefore nouns is not clear, especially when additional comparisons and contrasts reveal that *main* and *chief*, in the meanings under consideration, are neither like each other nor like typical nouns.

Such questions and puzzles, however, are precisely the point that is to be made. We do not have final truths about many linguistic matters, but we do have ways and means of investigation. We explore, we test, and we evaluate—this is linguistics.

Problems for untrained linguists.

There seems to be widespread agreement today that students learn more mathematics and science if the learning process gets them to do the things that mathematicians and scientists do—that is, gets them to learn and to use the tools and techniques of these disciplines. It seems that behaviors of this kind develop the powerful concepts and problem solving procedures characterized so eloquently by Jerome Bruner. To put it in other often said words, we do not know what tomorrow's problems will be and so we cannot teach the answers; we can only teach some of the ways of finding answers. This is also, as I have tried to show, another way of describing linguistics. And, as I am about to try to show, this is also exactly the kind of thing that school children can do.⁶ Consider the following exercise which I observed in a fourth-grade science class.

The teacher asked her students for any

terms that they associated with weather, all of which were written on the chalkboard: *sun, air, water, temperature, clouds, sky, fog, evaporation, time, seasons, smog, hail, electricity, wind, and humidity*. "Now let's classify," said the teacher. "Let's find groups of terms that go together." The students quickly agreed upon three main terms (*sun, air, and water*), but it took vigorous discussion for them to reach the following tentative classification:

<i>sun</i>	<i>air</i>	<i>water</i>	?
temperature	sky	clouds	evaporation
seasons	wind	fog	electricity
time		hail	
		smog	
		humidity	

Although many terms fell into place easily, *evaporation* and *electricity* produced only disagreement—thus the column labeled "?" was added, hopefully only a temporary expedient. The teacher made it clear that their work was only a tentative classification; it might well need revision, major or minor. I might add that the students were participating enthusiastically, were learning about the subject matter, and were thinking in the disciplined and productive way that is characteristic of the scientist. As Bruner says, such activity is worthwhile for its own sake.

Since language is so complex a system there is probably no known end to the classifying problems that can be presented to students. It is not a question of what children can do but of how to build great numbers of activities into a meaningful curriculum. The following, then, are presented only as examples. They are given in the form of unstructured exercises because, first, honest and meaningful investigations should create their own structure and, second, such exercises perhaps show that intelligent investigations can be carried out by

⁵W. Nelson Francis, *The Structure of American English*. New York: The Ronald Press, 1958, p. 269.

⁶That is, they can do it insofar as they have control of the data and insofar as they can classify and generalize, which is what the activities require. I do not believe that there is any reason to doubt the ability of the fourth grader to work successfully with most of the activities I describe, even though we have traditionally done precious little to develop these abilities in school children.

untrained students and teachers alike. One assumption which might be mentioned is the unappreciated fact that every native speaker of English brings to the task a great deal of data and built-in knowledge about the data (young students of language have a great deal more to work with than do young students of science).

As a beginning it would make sense to keep a model in mind (here, for example, we can use the weather terminology model). Suppose, then, that we tell our students we are going to carry out a scientific investigation into the kinds of words that we have in the English language and that we are going to collect data by writing on the chalkboard every word suggested by the students. This approach would give us a list of unrelated items:

teacher	boy	student	orchard
school	English	green	blue
girl	mother	a	smart
go	the	in	run
play	geranium	crazy	round

To work successfully with such data, students must keep in mind two principles (but it will take experience to appreciate them). First, the criteria for classifying items have to be of the same order. For example, if we decide to classify words according to their sounds, we cannot in the same scheme classify other words according to their spellings. Second, the resulting classification scheme must be significant in some way. We need not begin with a preconceived notion of what is significant, but if our results are not meaningful we should stop and ask questions.

With these principles in mind, students can begin to classify, and any proposed method of classification should be worth going along with until it is rejected by the students themselves. Suppose, for example, someone suggests arranging words by alpha-

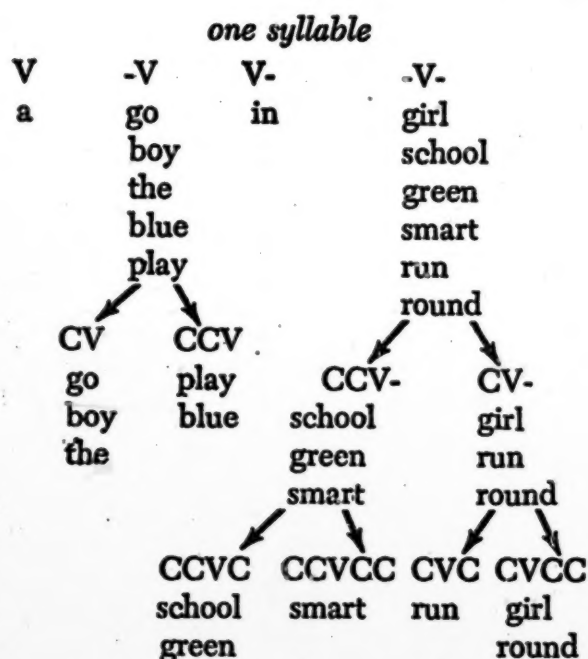
betical order. We should go along with the method, but we should also know when and how to remind students of the two principles mentioned in the preceding paragraph, for these will sooner or later force us to ask questions. Does alphabetical order tell us anything about "kinds" of words? Once we have discovered the a-b-c method that orders the sequence of words, is there any point in going on with the ordering? What will it tell us if we do?

So let's try another criterion—how about number of syllables? If this method is used, we would get:

<i>one syllable</i>	<i>two syllables</i>	<i>more than two</i>
boy	a	teacher geranium
go	in	English
girl	blue	mother
school	smart	student
the	run	orchard
green	play	crazy
	round	

Even this beginning suggests an interesting hypothesis: most English words are monosyllabic. This we could test by gathering more data. And we would soon find that we have to decide what we mean by "most" words—total occurrences of words in use, as found in a text or in everyday speech, or total words in the language, as found in a dictionary list. We might then want to compare our results for English with results obtained from other languages, which would be especially valuable if the students are studying a foreign language.

We should encourage students to find what further sub-classifying can be done with the above words. We might, for example, break down the syllables into consonant-vowel groups, perhaps words beginning with a V, words ending with a V, words with a V between C's, etc., getting something like the following:



The above classification is based on sounds rather than spellings (spellings would give slightly different results). Making students aware of the differences and of the systematic way of investigating the differences would seem to be only one of the outcomes of the activity.

Or suppose that we decide to classify spellings according to the regularity of their correspondence to sounds. Criteria for regularity of correspondence will be difficult to establish, but just the attempt should result in valuable learnings. Suppose, then, that after much discussion and pre-classification of all the data that we can muster, we begin our definition of "regularity" as follows:

1. Final stressed V spells the "long" sound (*he, hi, go*, etc.)
2. *a* + C spells the "short a" (*bad, cat*, etc.)
3. But *a* + *y* (*i*) spells the sound in *play* and *maid*.
4. But *a* + C + *e* spells the "long sound" (*made, date*, etc.)
5. *o* + C spells the "short o" (*hot, rock*, etc.)

6. But *o* + *y* (*i*) spells the sound in *boy* and *noise*.

7. But *o* + C + *e* spells the "long sound" (*note, hope*, etc.)

8. *u* + C spells the "short u" (*but, dumb*, etc.)

9. But *u* + *e* spells the "long sound" in *blue, true*, etc.

10. But *u* + C + *e* spells the "long sound" (*tune, tube*, etc.)

By working out such definitions, students will learn a great deal about spelling as well as classifying. At any rate, to suggest the resulting classification:

regularity between spellings and sounds	one irregu- larity	two irregu- larities
boy	mother	orchard
play	crazy	
blue		
in		
go		

Notice that if the classification is correct, students must also explain why *student* is not a case of *u* + C + *e*. By facing such questions, students come to grips with their language. They may not always get the right answers, but they always learn how to learn, which, most of us agree, is more important than the "answers."

Part-of-speech classification is a traditional problem, and I will take it as a final example. Let's assume that the first set of criteria is "kinds of meaning," and that we get the following:

people	things	actions	qualities	?
teacher	school	go	green	the
girl	English	run	blue	a
mother	orchard	play	crazy	in
student	geranium		round	
	play		smart	

It will not take a great deal of investigation to turn up worthwhile problems. Let me consider a few. (1) If we introduce *dog* into the data, we will either have to make up a new category ("animals") or have to broaden our present category "people" so as to include non-human animals. Notice, too, that if we make it broad enough to include all living things, we will have to move *geranium* out of the "things" category. (2) In the above classification, we decided to put *play* under two categories in order to cover the noun and the verb meanings of the one (?) word. If we do this for *play*, shouldn't we do it for other words on the list too? (3) Since we have under "things" at least several kinds of things—concrete, abstract, living—we must ask if such a large general category is satisfactory. What will happen if we try to recognize important sub-categories? (4) One column is labeled "?" because, for these items, there is no obvious label corresponding to something in the real world. If we come up with a label like "function words," will it violate the principle that in classification the criteria must be of the same order? If it does, what can we do to save our scheme of classification? Can we, perhaps, categorize all such words as "non-meaning" or "non-referential"? Or is this just specious? (5) In the "?" category we will soon be adding words like *and* and *but* and *while*, and what will we do with *her* and *who* and the verb auxiliaries?

Assuming that we are trying to classify "kinds" of words, we may decide (because of questions like those in 5) to try a classification scheme based on the way words work in the language instead of on their meanings. Thus, for example, if we consider the changes in the forms of words, we will come up with something like this:

	-s	-s, -ing, -ed	-er, est	no change
teacher		go	green	English
girl		run	blue	the
mother		play	smart	a
student			crazy	in
school			round	
orchard				
geranium				
play				

Such a classification presents some different interesting questions. (1) Notice that *play* again appears in two categories. If this is necessary for *play*, isn't it necessary for some other words on the list? (2) As native speakers, we know that *English* does not belong in the same category with *the*, *a*, and *in*, and some students will likely tell us that *English* is a noun and belongs in the category of "-s" words. We must insist, however, that as serious students we cannot remove *English* from the "no change" category until our system accounts for it. At the same time, we won't be satisfied with our classification until it suits our intuitions as native speakers. Such considerations make the problem "interesting" whether we are linguists or fourth graders.

Let me repeat that I have not attempted to resolve any questions about the structure of our language. This has not been my purpose and it should not be the purpose in the elementary classroom. What we are attempting is simple enough, I think, and yet profoundly valuable: we want to teach a disciplined way of thinking; to teach ways of organizing knowledge; to teach children how to make valid generalizations; to further the growth of concepts; to teach children to ask significant and relevant questions; and also to teach children something about the nature of language in general and English in particular. All except the last are, I

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suppose, what Bruner means by learning experiences that are worthwhile for their own sake. The last is the practical one, and I submit that such learning experiences will teach a great deal more grammar (and vocabulary and spelling among other language arts matters) than will any conceivable dose of our present textbooks; in fact, when children do turn to their English texts, they

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might very well know what to make out of the grammar that is to be found there. Finally, when children reach junior high, let's say, they will be ready to tackle some systematic grammars of their language (and perhaps of a foreign language that they are studying). If they can tackle mathematical systems, can't they tackle grammatical systems?

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